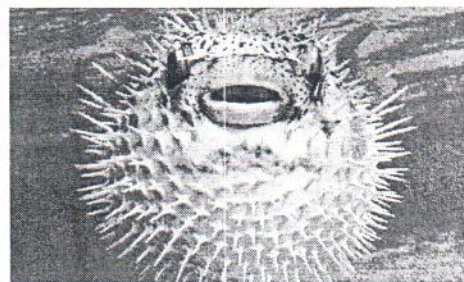


Name: key Date: _____ Period: _____

Cell Signaling Statistics Assignment

Ms. OK, AP Biology, 2014-2015

Tetrodotoxin (commonly known as TTX) is a neurotoxin found in several species including pufferfish, rough-skinned newts, ocean sunfish, blue-ringed octopus, etc. Tetrodotoxin prevents action potentials from traveling down nerve cells by binding to voltage-gated sodium channels on the nerve cell membrane. This prevents the sodium channels from opening, so Na^+ will not be able to enter the nerve cell through the channels to carry out the depolarization phase of the action potential. Nerve cells cannot signal to muscle cells to contract, and this could result in death if muscles like the diaphragm are paralyzed and unable to initiate breathing.



Let's say scientists wanted to design an experiment to see if applying TTX to nerve cells would affect the amount of Na^+ ions entering the nerve cell. They compared the TTX nerve cells to normal nerve cells that were not exposed to TTX.

What is the null hypothesis for their experiment?

there is no statistically significant difference between # of Na^+ entering TTX nerve cells vs. normal nerve cells

What is the alternate hypothesis for their experiment? You should express this in two ways (see below).

A) Write the alternate hypothesis as the exact opposite statement of the null hypothesis given above.

There is a statistically significant difference between "

B) Write the alternate hypothesis in "If, then" format using the following stem... "If nerve cells are exposed to TTX, then..."

if nerve cells are exposed to TTX, then the # of Na^+ ions entering the nerve cells will be significantly different from normal nerve cells

Let's say the scientists collected the following data... (Note: The scientists submerged the TTX nerve cells and normal nerve cells in the same solution containing Na^+ ions.)

Trial	# of Na^+ ions entering the TTX nerve cells	# of Na^+ ions entering the normal nerve cells
1	10	62
2	3	74
3	7	65
4	4	69
5	11	61
Sum for each column	35	331
Total Na^+ ions entering cells	366	

1. Use the data in the chart above to calculate the **mean** for each set of data.

Why use this formula?

Use the mean formula when you want to calculate the average of a set of values (data points). When you calculate the mean for two sets of values, this allows you to easily compare the sets of values

Formula

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

Note: I agree with you... this formula makes NO SENSE! The easiest way to calculate mean is simply by adding the data points together and dividing by the number of data points (n).